emitted. Once a total actual dose administered matches a total desired dose, the programmable controller **25** may stop the supply of high voltage to the x-ray emitter **21**. The x-ray emitter **21** and sheath **22** may be removed from the patient to conclude treatment.

While the embodiments of the invention disclosed herein are presently considered to be preferred, various changes and modifications can be made without departing from the spirit and scope of the invention. The scope of the invention is indicated in the appended claims, and all changes that come within the meaning and range of equivalents are intended to be embraced therein.

CLAIMS

1. A system for emitting x-rays comprising:
an x-ray emitter;
a controller operably connected to the x-ray emitter;
a current sensor operably connected to the controller; and
a voltage sensor operably connected to the controller; wherein the controller determines an actual dose rate based on a received current sensor signal and a received voltage sensor signal and adjusts a supplied voltage to allow the actual dose rate to match a predetermined dose rate.

2. The system of claim 1 wherein the current sensor measures the current through the x-ray emitter a plurality of times per second.

3. The system of claim 1 wherein the voltage sensor measures the voltage through the x-ray emitter a plurality of times per second.

4. The system of claim 1 wherein the controller adjusts the actual dose rate based on an irradiation depth.

5. The system of claim 1 wherein the actual dose rate is calculated a plurality of times per second.

6. The system of claim 1 wherein the actual dose rate is determined according to:

$D = f \times I \times (V-V_0)^2$; wherein

D = the actual dose rate at a distance r from the emitter,

f = a constant,

I = a current through the x-ray emitter,

V = a voltage applied across an anode and a cathode, and

V_0 = a constant.

7. The system of claim 1 wherein the controller adjusts the actual dose rate by correcting for tissue radiation absorption.

8. The system of claim 1 wherein the controller adjusts the actual dose rate by correcting for an increased target area with an increasing treatment radius.

9. The system of claim 1 further comprising a current integrator operably connected to the current sensor and the controller to integrate instant current values over time to determine an accumulated charge.

10. A method of operating a device for emitting x-rays comprising:
applying a voltage from a voltage source to the device;
measuring current and voltage within the device;
determining an actual dose rate based on the measured current and voltage;
comparing a desired dose rate to the actual dose rate;
adjusting the applied voltage; and
matching the actual dose rate to the desired dose rate.

11. The method of claim 10 wherein the measuring of the current and voltage comprises sampling the current and voltage a plurality of times per second.

12. The method of claim 10 wherein the determining of the actual dose rate comprises adjusting for an irradiation depth.

13. The method of claim 10 wherein the determining of the actual dose rate comprises correcting for tissue radiation absorption.

14. The method of claim 10 wherein the determining of the actual dose rate comprises calculating the actual dose rate a plurality of times per second.

15. The method of claim 10 wherein the determining of the actual dose rate comprises calculating the actual dose rate according to:
$D = f \times I \times (V-V_0)^2$; wherein
D = the actual dose rate at a distance r from the emitter,
f = a constant,
I = a current through the x-ray emitter,
V = a voltage applied across an anode and a cathode, and
V_0 = a constant.

16. The system of claim 10 wherein the determining of the actual dose rate comprises integrating instant current values over time to determine an accumulated charge.

17. The method of claim 10 wherein the adjusting of the applied voltage comprises stabilizing the actual dose rate.

18. The method of claim 10 further comprising selecting the desired dose rate by an operator.

19. A computer usable medium storing a program comprising;

computer readable code for determining an actual dose rate based on the measured current and voltage;

computer readable code for comparing a desired dose rate to the actual dose rate;

computer readable code for adjusting the applied voltage; and

computer readable code for matching the actual dose rate to the desired dose rate.

20. A system for emitting x-rays comprising:

means for measuring current and voltage;

means for determining an actual dose rate based on a measured current and voltage;

means for comparing a desired dose rate to the actual dose rate;

means for adjusting the applied voltage; and

means for matching the actual dose rate to the desired dose rate.